SHVARTS, M.A., inzh.

Supporting intramine commercial accounting in the basic sections of Pechora Basin mines. Izv.vys.ucheb.zav.; gor.zhur. 5 no.9:48-52 '62. (MIRA 15:11)

1. Leningradskiy ordena Lenina i ordena Trudovogo Krasnogo Znameni gornyy institut imeni G.V.Plekhanova. Rekomendovana kafedroy ekonomiki i organizatsii proizvodstva.
(Pechora Basin--Coal mines and mining--Accounting)

SHVARTS, M.E.

Sealing annular gaps in tanks with metal pontoons roofs. Transp. i khran. nefti no. 3:12-16 '63. (MIRA 17:7)

1. Glavnoye upravleniye po transportu i snabzheniyu neft'yu i nefteproduktami RSFSR.

SHVARTS, M.E.

Fluid flow through a bead rubber separator depending on the area of contact with the pipeline. Transp. i khran. nefti i nefteprod. no.8: 7-11 '6. (MIRA 17:9)

1. Spetsial'noye konstruktorskoye byuro "Transneft' avtomatika".

[illegible]

MA[illegible]SKI[illegible], [illegible]; [illegible]HVARTS, M.[illegible]

U[illegible]ing ba[illegible] rubber separators. Nef[illegible]. [illegible] [illegible] no.[illegible] D '64
(MIRA 18:[illegible])

APPROVED FOR RELEASE: 08/31/2001 CIA-RDP86-00513R001550330001-3"

SHVARTS, M.A.

Round elastic separators for pipelines. Transp. i khran. nefti no.7:12-14 '63. (MIRA 17:3)

1. Glavnoye upravelniye po transportu i snabzheniyu neft'yu i nefteproduktami RSFSR.

TURBIN, N.V.; KEDROVA-ZIKHMAN, L.V.; SHVARTS, M.K.

Breeding for combining ability. Biul. Inst. biol. AN BSSR no.5:210-217 '60. (MIRA 14:7)

(~~HYBRIDIZATION~~, VEGETABLE)

SOV/137-59-3-7151

Translation from: Referativnyy zhurnal. Metallurgiya, 1959, Nr 3, p 316 (USSR)

AUTHORS: Afanas'yev, P. S., Shvarts, M. M.

TITLE: Application of Ultrasonics for Cleansing of Surfaces (Primeneniye ul'trazvuka dlya ochistki poverkhnostey)

PERIODICAL: Tyazh. prom-st' Podmoskov'ya (Mosk. obl. sovnarkhoz), 1958, Nr 5, pp 20-22

ABSTRACT: The author developed an ultrasonic method for cleansing (degreasing and etching) surfaces by means of a UZG-10 type ultrasonic generator. Compositions of solutions for degreasing and etching and for simultaneous degreasing and loosening of scale are adduced. The authors note the high corrosion resistance of pipes treated with ultrasonics as compared to those cleaned by sandblasting.

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APPROVED FOR RELEASE: 08/31/2001 CIA-RDP86-00513R001550330001-3"

ANGELOV, I.I.; SHVARTS, M.M.; BURIS, Ye.V.; KHAINSON, S.I.

Preparation of high purity alkaline earth chlorides and carbonates, sodium chloride, ammonium molybdate, and ammonium tungstate. Trudy IREA no.22:159-162 '58. (MIRA 14:6)

(Chlorides)
(Ammonium molybdate)
(Ammonium tungstate)
(Carbonates)

ANGELOV, I.I.; PEVTSOV, G.A.; SHVARTS, M.M.

Preparation of spectrally pure magnesium oxide, sodium chloride, sodium carbonate, and calcium oxide. Trudy IREA no.23: 31-39 '59. (MIRA 13:7)
(Carbonates) (Oxides) (Salts)

S/064/63/000/002/005/005
B117/B186

AUTHORS: Stepin, B. D., Blyum, G. Z., Shvarts, M. M.

TITLE: Methods of purifying silicon dioxide from microimpurities

PERIODICAL: Khimicheskaya promyshlennost', no. 2, 1963, 58 - 62

TEXT: This is a survey of western and Soviet publications issued mainly from 1942 to 1962 (some earlier patents and papers being also mentioned). Description are given of: the effect of raw materials on the quality of quartz products, methods of purifying natural quartz; methods of purifying the raw material in the production of synthetic silicon dioxide; methods of obtaining high-purity silicon dioxide from high-purity silicon compounds. There are 2 tables and 71 references.

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STEPIN, B.D.; BLYUM, G.Z.; SHVARTS, M.M.

Methods for the removal of microimpurities from silicon dioxide. Khim. prom. no.2:138-142 F '63. (MIRA 16:7)

(Silica)

KUZNETSOVA, G.P.; SHVARTS, M.M.; STEPIN, B.D.

Preparation of highly pure sodium and potassium monochromates. Izv. AN SSSR. Neorg. mat. 1 no.11:1938-1944 N '65. (MIRA 18:12)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut khimicheskikh reaktivov i osobochistykh khimicheskikh veshchestv. Submitted May 14, 1965.

SKACHKOVA, I.F.; SHVARTS, M.V.

Dew measurement. Meteor. i gidrol. no.4:55-58 Ap '58.
(MIRA 12:5)

(Dew)

3(7)

SOV/50-59-4- 4/21

AUTHORS: Skachkova, I. F., Shvarts, M. V.

TITLE: Measurement of Dew (Ob izmerenii rosy)

PERIODICAL: Meteorologiya i gidrologiya, 1959, Nr 4, pp 55-58 (USSR)

ABSTRACT: The dew recorder by Kessler (Ref 3) and the method of measuring dew by Duvdevani (Ref 4) are pointed out and described here. Up to date, there were no such apparatus available in the USSR. Up to now, the dew recorder by Yaroshevskiy was used for tests. But the latter is very inconvenient in use. The author describes here a new device for measuring dew. The weight principle was used for it. As many standardized parts as possible were used for the construction. The device is described here. A picture, a sectional view and a record of the dew recorder are shown. The dew recorder was tested in summer and fall 1957. The tests were carried out in the village of Koltushi, at the meteorological station of Voyeykovo and on Lake Sevan. The device proved to be convenient and reliable in operation, the few shortcomings have been eliminated so that the device can be used at the meteorological stations. There are 3 figures and 4 references, 1 of which is Soviet.

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ZAYTSEVA, A.F.; KAGANOVICH, G.A.; SOKHANEVA, M.M.; SHVARTS, N.I.

Treatment of peptic ulcer of the stomach and duodenum with hexonium. Sov.med. no.3:16-20 '62. (MIRA 15:5)

1. Iz terapevticheskogo otdeleniya (zav. - prof. N.I. Shvarts) i 2-y Gorodskoy bol'nitsy (glavnyy vrach B.V. Goyev), Leningrad.
(PEPTIC ULCER) (HEXONIUM)

GIRGOLAV, S.S., professor (Leningrad); LEVIT, V.S., professor (Moskva); BABCHIN, I.S., professor (Leningrad); BAKULEV, A.N., professor (Moskva); BEKKERMAN, L.S., dotsent (Leningrad); VAYNSHTEYN, V.G., professor (Leningrad); GERTSBERG, V.G., professor (Kazan'); GINZBERG, M.M., professor (Moskva) [deceased]; GOTLIB, Ya.G, professor (Moskva); DZHANELIDZE, Yu.Yu., professor (Leningrad); DRACHINSKAYA, Ye.S., dotsent (Leningrad); YELANSKIY, N.N., professor (Leningrad); KORNEV, P.G., professor (Leningrad); KOCHERGIN, I.G., professor (Moskva); LIMBERG, A.A., professor (Leningrad); LINBERG, B.E., professor (Moskva); MEZENEV, S.A., dotsent (Leningrad); NAZAROV, V.M., professor (Leningrad); OZEROV, A.D., professor (Leningrad) [deceased]; OSTEN-SAKEN, E.Yu., professor (Leningrad) [deceased]; PETROV, N.N., professor (Leningrad); POLENOV, A.L., professor (Leningrad); SAMARIN, N.P., professor (Leningrad); SHVARTS, N.V., professor (Leningrad) [deceased]; SHAMOV, V.N., professor (Leningrad); SHABANOV, A., redaktor

[Manual of specialized surgery] Uchebnik chastnoi khirurgii. Sost. I.S.Babchin i dr. Izd. 2-oe, ispr. i dop. Moskva, Narkomzdrav SSSR, Gos. izd-vo med. lit-ry "Medgiz," Vol.1. 1946. 363 p. (MIRA 10:2)
(SURGERY)

SHVARTS [illegible]

М. А. Миллер

Ускорение плазменных сгустков высокочастотными электромагнитными полями

10 июня

(с 18 до 22 часов)

Д. И. Воскресенский,
Р. А. Грановская

Замедляющая система в виде [illegible] для ЛБВ

С. Г. Константинов

Отклоняющая система с бегущей волной

[illegible]
[illegible]
[illegible]
[illegible]

Исследование электронных явлений в пространстве взаимодействия приборов СВЧ с помощью автомата для построения траекторий заряженных частиц

Г. А. [illegible],
Е. Д. [illegible]

Замедляющая цепь типа фильтра для мощных ламп с бегущей волной дециметрового диапазона

11 июня

(с 10 до 15 часов)

Совместное заседание с секцией ферритовых устройств СВЧ

В. Н. Зубков, [illegible]

Некоторые вопросы теории параметрических усилителей

В. Н. [illegible]

К теории ферритового усилителя

В. Н. [illegible],
Ю. Т. [illegible],
В. В. [illegible]

Экспериментальное исследование ферритового усилителя

А. Л. Микаэлян,
[illegible]

Некоторые результаты исследования ферритовых усилителей

А. С. Тагер

К теории параметрического усиления в волноводных системах

report submitted for the Centennial Meeting of the Scientific Technological Society of Radio Engineering and Electrical Communications im. A. S. Popov (VNORiE), Moscow, 8-12 June. 1959

SHVARTS, Sh. Z.

М. Л. Цетлин,
Л. Ю. Шестиков

О синтезе одного класса сети из ферротранзисторных элементов.

III. СЕКЦИЯ ФЕРРИТОВЫХ УСТРОЙСТВ СВЧ

Руководитель А. Л. Микаэлян

11 июня

(с 10 до 16 часов)

Совместное заседание с секцией электроники

Ф. И. Зубков,
М. С. Мальцев

Некоторые вопросы теории параметрических усилителей

В. П. Тычинский

К теории ферритового усилителя

В. П. Тычинский,
Ю. Т. Дерюгин,
В. В. Корницкий

Экспериментальное исследование ферритового усилителя

А. Л. Микаэлян,
Ш. З. Шварц

Некоторые результаты исследования ферритовых усилителей

А. С. Тагер

К теории параметрического усиления в волноводных системах

11 июня

(с 18 до 22 часов)

А. А. Пистолькорс,
Сюй Яо-Шень

Колебания малой гиротропной сферы в поле плоской волны.

А. Л. Микаэлян,
В. Я. Антоньянц

Смешение сверхвысоких частот в ферритах

А. Л. Микаэлян,
А. К. Ставцев

О ферритовых вентилях предельного типа

А. Л. Микаэлян,
Ш. Г. Тобианбаум

Применение ферритов для управления частотой электромагнитных волн

report submitted for the Centennial Meeting of the Scientific Technological Society of Radio Engineering and Electrical Communications im. A. S. Popov (VNORiE), Moscow, 8-12 June. 1959

SOV/109-4-7-14/25

AUTHORS: Mikaelyan, A.L. and Shvarts, N.Z.

TITLE: Some Properties of a Ferrite Amplifier for Centimetre Waves

PERIODICAL: Radiotekhnika i elektronika, 1959, Vol 4, Nr 7, pp 1196 - 1197 (USSR)

ABSTRACT: The amplifier which was investigated was first proposed by H. Suhl (Ref 1) and constructed by M. Weiss (Ref 2). The actual oscillator constructed by the authors comprised a waveguide of a reduced cross-section for the "pump" frequency and a quarter-wave strip resonator for the signal frequency; the pumping frequency was twice the signal frequency. A pulse magnetron was used as a source of/the pumping signal. The experimental results obtained with the amplifier are illustrated in Figures 1-4. Figure 1 shows the dependence of the amplification coefficient on the power of the pump source. It is seen that the gain rapidly increases with the pumping-source power. Figure 2 illustrates the dependence of the gain on the magnetic field; it is seen that a resonance effect can be observed; this is accompanied by instability

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and leads to the appearance of oscillations. Figure 3 shows the pump-source power required to produce oscillations at various magnetic fields. The oscillation power (at a constant magnetic field), as a function of the pump power, is plotted in Figure 4. Here, a saturation effect is observed, this being due to the non-linear phenomena in the ferrite. There are 4 figures and 5 references, of which 3 are English and 2 Soviet.

SUBMITTED: March 4, 1959

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SOV/109-5-1-11/20

9.2530

AUTHORS: Mikaelyan, A. L., Shvarts, N. Z.

TITLE: Some Problems on the Investigation of Ferrite Amplifiers of the Electromagnetic Type

PERIODICAL: Radiotekhnika i elektronika, 1960, Vol 5, Nr 1, pp 126-140 (USSR)

ABSTRACT: Problems of theoretical and experimental investigations of ferrite amplifiers of the electromagnetic type are discussed. Formulas are developed for calculating the threshold power of pumping, which take into account the peculiarities of amplifier resonators. The agreement between these formulas and experiments for different variations of degenerate electromagnetic amplifiers permitted determination of the optimum conditions for lowering the pumping power to 500 w. Data on investigation of the electromagnetic amplifier of the nondegenerate type are given. Introduction. The present paper investigates dif-

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ferent ferrite amplifiers of the electromagnetic type. The general theory was worked out by U.S. scientist H. Suhl (see ref at end of abstract), and further experimental and theoretical investigations by others were mostly concerned with the practical use of these amplifiers. The experimental and theoretical results, and calculations of the auxiliary source (pumping power), are very important for a proper design of the amplifier. (1) Derivation of Relations for the Threshold Power. (a) Case of Resonance ($\omega = \omega_{res}$). The problem of computing the threshold power for a ferrite resonator of the electromagnetic type, having a tangentially magnetized thin disc located in the resonator, tuned in on frequencies ω_1 and ω_2, was investigated. Linear polarization with a frequency $\omega = \omega_1 + \omega_2$ is assumed for the pumping field. The case is investigated when all three frequencies are present and the magnetizing field is in the plane YOZ, the field being directed

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along the Z -axis. The component of the intensity of magnetisation of the frequency ω is given by:

$$\frac{dM}{dt} = \gamma[\vec{M}H^i] + \frac{a}{|M|}[\vec{M}\dot{\vec{M}}], \qquad (1)$$

where M is intensity of magnetization; $\gamma = |e|/mc$, gyromagnetic ratio; H^i, effective internal magnetic field; $\frac{a}{M}[\vec{M}\dot{\vec{M}}]$, term, considering losses. The influence of the weak fields of ω_1 and ω_2 on the magnetic moment induced by the field frequency ω is negligible. Since the disc is located in the plane YOZ, the components of the effective internal magnetic field are:

$$H_x^i = -N_x M_x, \quad H_y^i = h_y e^{j\omega t}, \quad H_z^i = H_0, \qquad (2)$$

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where h_y^e is amplitude component of the SHF field, perpendicular to the magnetizing field; M_x, variable component of the intensity of magnetization; $N_x = 4\pi$, demagnetization factor along axis $x (N_y = N_z = 0)$; H_o, magnetizing field. The intensities of magnetization M_x and M_y are determined from the linear approximations of solutions of Eq. (1):

$$4\pi M_x(\omega) = \frac{\alpha\omega^2\omega_M(2\omega_0 + \omega_M) - j\omega\omega_M(\omega^2 - \omega_0^2 - \omega_0\omega_M)}{(\omega^2 - \omega_0^2 - \omega_0\omega_M)^2 + \alpha^2\omega^2(2\omega_0 + \omega_M)^2} h_y^e e^{j\omega t}, \tag{3}$$

$$4\pi M_y(\omega) = -\left[\frac{(\omega^2 - \omega_0^2 - \omega_0\omega_M)(\omega_0 + \omega_M)\omega_M - \alpha^2\omega^2\omega_M(2\omega_0 + \omega_M)}{(\omega^2 - \omega_0^2 - \omega_0\omega_M)^2 + \alpha^2\omega^2(2\omega_0 + \omega_M)^2}\right.$$

$$\left. + j\frac{\alpha\omega\omega_M[(2\omega_0 + \omega_M)(\omega_0 + \omega_M) + (\omega^2 - \omega_0^2 - \omega_0\omega_M)]}{(\omega^2 - \omega_0^2 - \omega_0\omega_M)^2 + \alpha^2\omega^2(2\omega_0 + \omega_M)^2}\right] h_y^e e^{j\omega t}. \tag{4}$$

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where $\alpha = \gamma \Delta H/\omega$ is coefficient characterizing attenuation, determined by the half-width of the resonance curve; ω pumping frequency; $\omega_M = 4\pi\gamma M_0$, variable, proportional to intensity of magnetization of the ferrite; $\omega_0 = \gamma H_0$, frequency of ferromagnetic resonance of the sphere. From the above equations, the frequency of the ferromagnetic resonance is:

$$\omega_{res} = \sqrt{\omega_0(\omega_0 + \omega_M)} = \gamma\sqrt{H_0(H_0 + 4\pi M_0)}. \qquad (5)$$

The relative intensity of magnetization at the resonance point is:

$$m_{y\,res} = \frac{M_{y\,res}}{M_0} = \mathrm{Re}\left[-j\frac{\omega_0 + \omega_M}{2\omega_0 + \omega_M}\frac{h_y^e e^{j\omega t}}{\Delta H}\right] = m_{y0}\sin\omega t, \qquad (6)$$

$$m_{x\,res} = \frac{M_{x\,res}}{M_0} = \mathrm{Re}\left[\frac{\omega}{2\omega_0 + \omega_M}\frac{h_y^e e^{j\omega t}}{\Delta H}\right] = m_{x0}\cos\omega t. \qquad (7)$$

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where

$$m_{y0} = \frac{M_{y0}}{M_0} = \frac{\omega_0 + \omega_M}{2\omega_0 + \omega_M} \frac{h_y^e}{\Delta H}; \qquad (8)$$

$$m_{x0} = \frac{M_{x0}}{M_0} = \frac{\omega}{2\omega_0 + \omega_M} \frac{h_y^e}{\Delta H}; \qquad (9)$$

and m_{yo}, m_{xo} are relative amplitudes of magnetization intensity components; $M_{y\ res}$, $M_{x\ res}$ are components of magnetization intensity; and M_{yo}, M_{xo} are amplitudes of these components. The above equations, containing ratios, can be used for any system of units. The influence of weak fields $\vec{H}(\omega_1)$ and $\vec{H}(\omega_z)$ on ferrite perturbed by a strong field of frequency ω is given by the equation of motion:

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$$\frac{d\vec{M}}{dt} = -\gamma\,[\vec{M}\,\vec{H}^{t}] \qquad (12)$$

Losses in the ferrite can be ignored here as long as ω_1 and ω_2 are far enough from ω_{res}. The external field includes the magnetizing field and the variable field of three frequencies.

$$\vec{H} = \vec{i}_z H_0 + \vec{H}(\omega) + \vec{H}(\omega_1) + \vec{H}(\omega_2). \qquad (13)$$

The pumping field $H(\omega)$ is already determined, and since fields of weak signals do not have components along the x-axis, they are expressed as:

$$\begin{aligned} H_x(\omega_1) &= -4\pi M_{x1}, \\ H_y(\omega_1) &= H_{y1}e^{j\omega_1 t} + H^{*}_{y1}e^{-j\omega_1 t}, \\ H_z(\omega_1) &= H_{z1}e^{j\omega_1 t} + H^{*}_{z1}e^{-j\omega_1 t} \end{aligned} \qquad (14)$$

for frequency ω_1, and similarly for ω_2. In a similar way, the magnetic moments are determined:

$$\dot{M} = \vec{i}_z M_0 + \dot{M}(\omega) + \dot{M}(\omega_1) + \dot{M}(\omega_2) \qquad (15)$$

Here, M_0 is ferrite magnetization intensity of saturation: $M(\omega)$ is given by (6), (7); $M(\omega_1)$, $M(\omega_2)$ are magnetic moments of frequencies ω_1 and ω_2, which can be determined as:

$$\dot{M}(\omega_1) = \dot{M}_1 e^{j\omega_1 t} + \dot{M}_1^* e^{-j\omega_1 t} \qquad (16)$$

and analogously for ω_2 with indices 2. For calculating the amplitudes of the intensity of a magnetization at frequency ω_1, the following equations are developed:

$$M_{x1} = -jk_1 H_{y1} + \tau_{1x} H^*_{z2},$$
$$M_{y1} = \chi_1 H_{y1} - j\tau_{1y} H^*_{z2} \qquad (21)$$
$$M_{z1} = -j\varkappa_2 H^*_{y2},$$

where

$$k_1 = \frac{\omega_M \omega_1}{4\pi(\omega_1^2 - \omega_0^2 - \omega_0\omega_M)}; \quad \tau_{1x} = \frac{\omega_M}{8\pi} \frac{\omega_1 m_{y0} + \omega_0 m_{x0}}{\omega_1^2 - \omega_0^2 - \omega_0\omega_M};$$
$$\tau_{1y} = \frac{\omega_M}{8\pi} \frac{(\omega_0 + \omega_M) m_{y0} + \omega_1 m_{x0}}{\omega_1^2 - \omega_0^2 - \omega_0\omega_M}; \qquad (22)$$
$$\chi_1 = -\frac{\omega_M}{4\pi} \frac{\omega_0 + \omega_M}{\omega_1^2 - \omega_0^2 - \omega_0\omega_M}; \quad \varkappa_2 = \frac{\omega_M}{8\pi} \frac{(\omega_0 + \omega_M) m_{y0} + \omega_1 m_{x0}}{\omega_1^2 - \omega_0^2 - \omega_0\omega_M}.$$

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For ω_2 indices 1 and 2 should be mutually interchanged. The threshold values of the pumping fields can be found from Maxwell's equations. Substituting into equation:

$$\operatorname{curl}\operatorname{curl}\vec{H} = -\frac{1}{c^2}\frac{\partial^2\vec{H}}{\partial t^2} - \frac{4\pi}{c^2}\frac{\partial^2\vec{M}}{\partial t^2} \qquad (23)$$

the unknown field $H = \sum a_n(t)h_n(r)$ resolved into normal types of resonator oscillations from (23), the equation describing the system oscillations for tuning in on $\Omega_1 = \omega_1$ is:

$$\ddot{a}_1 + \frac{\Omega_1}{Q_1}\dot{a}_1 + \Omega_1^2 a_1 = -4\pi \frac{\int\limits_{V_\Phi} \frac{\partial^2\vec{M}_1}{\partial t^2}\vec{h}_1 dv}{\int\limits_{V_0} \vec{h}_1^2 dv}. \qquad (24)$$

where the middle term of the left side considers losses in the resonator; V_Φ, is ferrite volume;

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V_0, resonator volume. $a_1(t)$ is given as:

$$a_1 = A_1 e^{(j\omega_1+\lambda)t} + A_1^* e^{(-j\omega_1+\lambda)t}, \qquad (25)$$

and the equation for determining the amplitude of field H, is:

$$\left(2\lambda + \frac{\omega_1}{Q_1}\right) A_1 = -j\omega_1 4\pi \frac{\int\limits_{V_\Phi} \vec{M}_1 \vec{h}_1 dv}{\int\limits_{V_0} \vec{h}_1^2 dv}. \qquad (26)$$

A similar equation can be set up for A_2^*. Into these equations $M_{1,2}$ from (21) and a similar term for ω_2 are inserted, and a system of two equations is written:

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$$\left(2\lambda + \frac{\omega_1}{Q_1}\right) A_1 = -\frac{j4\pi\omega_1}{\int\limits_{V_{el}} h^2 dv}\left[\tau_{1x}\int\limits_{V_\Phi} h_{x1}h_{z2}dv - j\tau_{1y}\int\limits_{V_\Phi} h_{y1}h_{z2}dv - j\varkappa_2\int\limits_{V_\Phi} h_{y2}h_{z1}dv\right] A_2 = \rho_{12}\dot{A}_2, \tag{27}$$

$$\left(2\lambda + \frac{\omega_2}{Q_2}\right) \dot{A}_2 = \frac{j4\pi\omega_2}{\int\limits_{V_{el}} h_2^2 dv}\left[\tau_{2x}\int\limits_{V_\Phi} h_{x2}h_{z1}dv + j\tau_{2y}\int\limits_{V_\Phi} h_{z1}h_{y2}dv + j\varkappa_1\int\limits_{V_\Phi} h_{y1}h_{z2}dv\right] A_1 = \dot{\rho}_{21}A_1. \tag{28}$$

For the condition:

$$\rho_{12}\dot{\rho}_{21} > \frac{\omega_1\omega_2}{Q_1Q_2} \tag{29}$$

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parameter $\lambda > 0$ corresponds to oscillation generation on frequencies ω_1 and ω_2. In Fig. 1 the case is shown when fields $H(\omega_1)$, $H(\omega_2)$, $H(\omega)$ lying in the ferrite disc plane have the same direction.

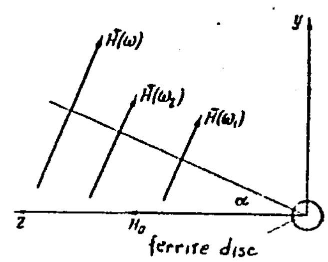

Fig. 1. Relative location of fields in a ferrite amplifier.

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The field threshold value for this case is:

$$h_v^c \geqslant \frac{\sqrt{\int\limits_{V_{\phi 1}} h_1^2 dv \int\limits_{V_{\phi 2}} h_2^2 dv}}{\int\limits_{V_\Phi} h_1 h_2 \sin\alpha \cos\alpha \, dv} \frac{2\Delta H}{\sqrt{Q_1 Q_2}} \times$$

$$\times \left| \frac{(\omega_1^2 - \omega_0^2 - \omega_0\omega_M)(\omega_2^2 - \omega_0^2 - \omega_0\omega_M)(2\omega_0 + \omega_M)}{\omega_M[(\omega_0 + \omega_M)^2 + \omega_1\omega](\omega_2^2 - \omega_0^2 - \omega_0\omega_M) + \omega_M[(\omega_0 + \omega_M)^2 + \omega_2\omega](\omega_1^2 - \omega_0^2 - \omega_0\omega_M)} \right|. \quad (31)$$

The relation between the field acting on ferrite and the absorbed power of pumping, assuming all energy to be absorbed by the ferrite, is determined by the expression (in the MKS system of units):

$$\int\limits_0^T \vec{H} \frac{d\vec{B}}{dt} dt \qquad (33)$$

where T is pumping frequency period. Using values of H and M from (2), (8), (9):

$$\int_0^T \vec{H}\frac{d\vec{B}}{dt}\,dt = \int_0^T H_x^1 \frac{d}{dt}(\mu_0 H_x^1 + \mu_0 M_{x\,res})\,dt +$$

$$+\int_0^T H_y^1 \frac{d}{dt}\mu_0 (H_y^1 + M_{y\,res})\,dt = \frac{\mu_0 M}{2\Delta H}\,\frac{\omega_0+\omega_M}{2\omega_0+\omega_M}\,\omega\,(h_y^e)^2\,T. \qquad (34)$$

This is the energy absorbed by a unit volume of the ferrite during one period. the equation for power absorbed by the whole sample is given and transformed into a more convenient form:

$$P_{abs} = \frac{4\pi M_0 \omega V_\phi (\omega_0+\omega_M)}{2\Delta H\,(2\omega_0+\omega_M)}\,8\cdot 10^{-12}\,(h_y^e)^2. \qquad (36)$$

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Here, P_{abs} is in watts; Δh, h_y^e is in oersteds; V_Φ, in mm^3; $4\pi M_0$ in gauss. For degenerate conditions the threshold value of power is:

$$P_{thresh.} = \frac{9\omega_0^2 (2\omega_0 + \omega_M)(\omega_0 + \omega_M)\,\omega}{32\omega_M^2 \left(\frac{3}{2}\omega_0 + \omega_M\right)^2} \frac{\mu_0 M_0 \Delta H V_\Phi}{Q_1^2} \frac{\left[\int\limits_{V_0} h_1^2 dv\right]^2}{\left[\int\limits_{V_\Phi} h_1^2 \sin\alpha \cos\alpha dv\right]^2}. \quad (37)$$

Energy accumulated in the resonator to the energy in ferrite must be determined for each definite case, e.g., for a two-conductor line consisting of flat strips of resonance length, the field can be considered uniform in cross section, and

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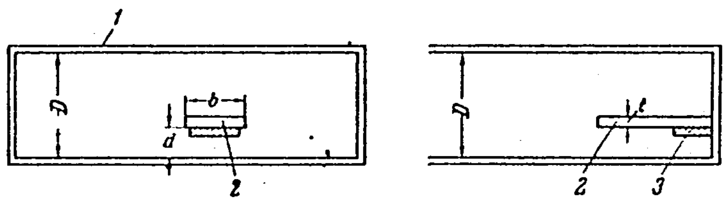
$$\frac{\int\limits_{V_0} h_1^2 dv}{\int\limits_{V_\Phi} h_1^2 \sin\alpha \cos\alpha \, dv} = \frac{h_1^2 \frac{V_0}{2}}{h_1^2 \frac{\sin 2\alpha}{2} V_\Phi} = \frac{V_0}{V_\Phi} \quad (\text{for } \alpha = 45^\circ). \tag{38}$$

where the ferrite is located in the maximum magnetic field, but the two-conductor line is at 45° to the magnetizing field.



 See Card 18 for Caption on Fig. 2.

Fig. 2. Asymmetrical strip resonator: (1) outside conductor of a signal resonator; (2) central conductor of signal resonator; (3) ferrite disc.

The waveguide walls serve as the outer conductor, which supplies the pumping power. In this case the field is not uniform in the cross section. The field configuration can be calculated or constructed graphically, for which purpose a method analogous to the method used for determination of capacitances is used, as shown on Fig. 3. The lines H and E divide the resonator into sections having a volume reciprocal to the field magnitude. The product $h_n a_n$ is constant (h_n = median field magnitude of a section; a_n = median transverse dimension of the section). For the applied method h_n^2 a_n determining the energy of each section is also constant. Taking the above statement and also the sinusoidal distribution of the field along axis z into consideration, the resonator energy is written as:

$$\int_{V_r} h_1^2 dv \simeq \sum_0^n \frac{1}{2} h_n^2 a_n^2 = \frac{1}{2} n h_{01}^2 a_1^2. \tag{39}$$

Here, h_{01} is field at the location of ferrite; a_1 cell dimension; n, number of cells in the resonator

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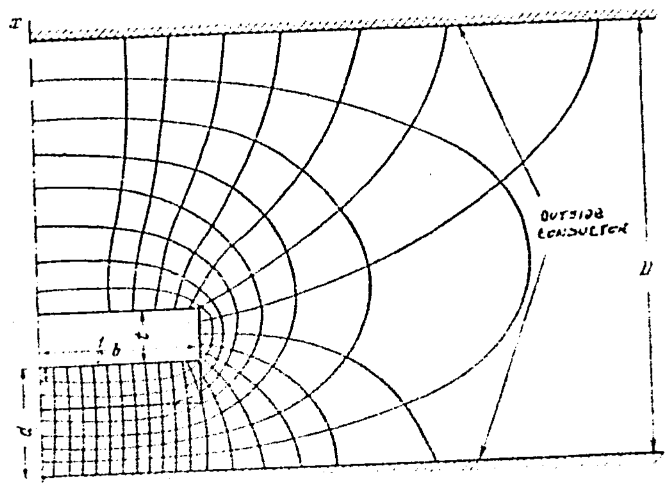

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See Card 21/37 for Caption to Fig. 3.

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Fig. 3. Field configuration in cross section of an asymmetrical strip line.

The part of the resonator between the inner and outer conductor, where the ferrite disc is located, is further called the working part, the volume of which is $V_1 = abd$ (Fig. 3), with the lines H parallel to the disc plane, and the field approximately uniform. The cell dimension is easily found as $a_1 = S_1/n_1 = V_1/n_1$, where S_1 and n_1 are cross section and number of cells in it, respectively. The approximate ratio of energy accumulated in the resonator to the energy in the ferrite is:

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$$\frac{\int\limits_{V_1} h_1^2 dv}{\int\limits_{V_\phi} h_1^2 \sin\alpha \cos\alpha dv} = \frac{\frac{1}{2} \cdot nh_{01}^2 \frac{V_1}{n_1}}{h_{01}^2 \frac{\sin 2\alpha}{2} V_\phi} = \frac{V_1\beta}{V_\phi \sin 2\alpha}, \tag{40}$$

where $\beta = n/n_1$, can be calculated from the field configuration as per Fig. 3. Figure 4 shows a diagram of β.

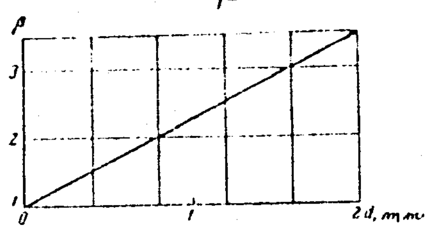

Fig. 4. Dependence of the coefficient on distance between strip and the outer conductor of the strip line (b = 3 mm, t = 0.5 mm, D = 4 mm).

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The final formula for the threshold value of power ($\alpha = 45^{\circ}$) is given as:

$$P_{Thr.} = \frac{9}{32} \frac{(2\omega_0 + \omega_M)(\omega_0 + \omega_M)\omega_0^3}{\left(\frac{3}{2}\omega_0 + \omega_M\right)^2 \omega_M^2} \frac{4\pi M_0 \omega \Delta H}{Q_1^2} \frac{(\beta V_1)^2}{V_\Phi} 8 \cdot 10^{-12}. \qquad (41)$$

Units of measurements in this equation are: field, in oersteds; intensity of magnetization, in gauss; volumes, mm3; power watts. It is of interest to note the linear relation of threshold power to the half-width ΔH. (b) Nonresonant pumping ($\omega \neq \omega_{res}$) is investigated for an area far off resonance. Without going into a detailed development, which is very similar to the previous development, the following equations are given for the components of the amplitude of magnetization intensity along the coordinate axes:

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$$
\begin{aligned}
M'_{x1} &= -jk_1 H_{y1} + \tau'_{1x} H'_{z2},\\
M'_{y1} &= \chi_1 H_{y1} + \tau'_{1y} H'_{z2},\\
M'_{z1} &= \chi'_2 H_{z2},
\end{aligned}
\tag{48}
$$

where k_1 and χ_1 are determined from (22); τ'_{1x}, τ'_{1y}, κ'_2 are different from the corresponding values from (22) in such fashion that instead of the relative amplitudes m_{xo}, m_{yo} the values of m'_{xo}, m'_{yo} should be inserted, which are:

$$
m'_{x0} = \frac{M'_{x0}}{M_0} = \frac{\omega}{\omega_0^2 - \omega^2 + \omega_0\omega_M}\,\gamma h_y^*, \tag{49}
$$

$$
m'_{y0} = \frac{M'_{y0}}{M_0} = \frac{\omega_0 + \omega_M}{\omega_0^2 - \omega^2 + \omega_0\omega_M}\,\gamma h_y^*. \tag{50}
$$

For ω_2 indices 1 and 2 must be interchanged in Eq. (48). The threshold value of the degenerate field for $\omega_1 = \omega_2 = 1/2\, \omega$ is:

$$h_v^e \geq \left| \frac{(\omega_1^2 - \omega_{\text{рез}}^2)(\omega_{\text{рез}}^2 - \omega^2)}{(\omega_0 + \omega_M)^2 + \omega_1 \omega} \right| \frac{\int\limits_{V_0} h_1^2 dv}{Q_1 \omega_M \gamma \int\limits_{V_\Phi} h_1^2 \sin\alpha \cos\alpha\, dv}. \tag{51}$$

Here,

$$\omega_{res} = \gamma \sqrt{H_0 (H_0 + 4\pi M_0)} \tag{52}$$

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is resonance frequency of the field H_0 in the working point; $\omega = \gamma \sqrt{H_{res}(H_{res} + 4\pi M_0)}$ is working frequency; H_0, H_{res} are field magnitudes in the working point and for resonance on the working frequency, respectively; $\omega_0 = \gamma H_0$. For nonresonant conditions the energy absorbed by the ferrite equals only some percent of the total energy; therefore, the usual waveguide methods may be used for computing the resonator field. The following equation for the threshold power is developed:

$$P_{THR} = \frac{\omega V\left[1+\left(\frac{lC}{\pi A}\right)^2\right]}{Q\cdot 32\pi\cdot 10^7}\left[\frac{V_{l3}}{V_{\varphi}\sin 2\alpha\cos\alpha}\,\frac{|(\omega_1^2-\omega_{RES}^2)(\omega_{RES}^2-\omega^2)|}{Q_1\omega_M\gamma\,|(\omega_0+\omega_M)^2+\omega_1\omega|}\right]^2. \qquad (58)$$

Substituting the field values from (52) into (58), a more convenient equation for $\alpha = 45^\circ$ results:

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$$P_{THR} = \frac{\omega V\left[1+\left(\frac{lC}{nA}\right)^2\right]}{Q\cdot 16\pi\cdot 10^7}\left[\frac{V_1\beta}{V_\phi Q_1 4\pi M_0}\times\right.$$

$$\left.\times\frac{\left[\frac{1}{4}H_{RES}(H_{RES}+4\pi M_0)-H_0(H_0+4\pi M_0)\right][H_0(H_0+4\pi M_0)-H_{RES}(H_{RES}+4\pi M_0)]}{(H_0+4\pi M_0)^2+\frac{1}{2}H_{RES}(H_{RES}+4\pi M_0)}\right]^2. \quad (59)$$

(2) Results of Experiments. (a) Resonance Case ($\omega=\omega_{res}$). The experiments were conducted using a reduced-size waveguide, through which the pumping signal was transmitted, and a quarter-wave flat strip-type resonator, tuned to the signal frequency, which equaled half of the pumping frequency. The wide waveguide walls served also as the outer con-

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ductor of the resonator, while the inner conductor was a metal plate (see Fig. 2). The inner conductor of the strip resonator could be located asymmetrically with respect to the waveguide walls. Ferrite monocrystals ($4\pi M_o$ = 3,200 gauss) in disc form were used. The intensity of the magnetic field was so selected that the resonance took place on the pumping frequency (H_o = 2,500 oersted). The discs used were of 3.5 mm diam, and 0.7 and 0.35 mm thickness. For these discs with a ratio of diam to thickness 5:1 to 10:1, the demagnetization factor needed to be considered only in the direction perpendicular to the disc plane. the experimental threshold values of power, with reference to the distance d, characterizing the field concentration at the location of the ferrite, are shown on Fig. 5 (for 0.35 mm disc) and Fig. 6 (for 0.7 mm disc).

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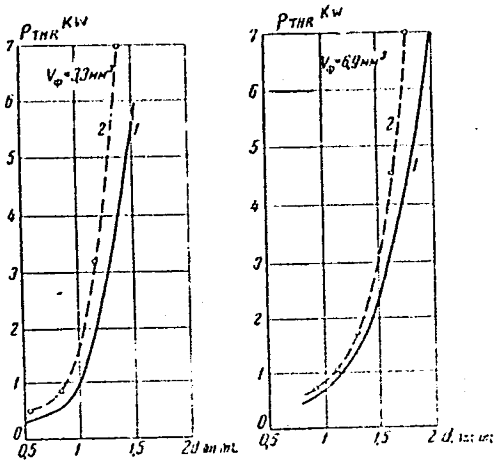

Figs. 5, 6. Threshold power vs. concentration of magnetic field in the ferrite area: (theoretical curve; (2) experimental curve.

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Calculations were made from Eq. (41) for $H_0 = 2,500$ oersted, $4\pi M_0 = 3,200$ gauss, and $\omega = 5.85 \times 10^{10}$ cps. The difference between theoretical and experimental results is within limits of errors of measurements. With increase of d, V_1 and β increase also, wherefore the threshold power increases rapidly, and only very little is compensated by a rise of Q_1. The half-width of the ferromagnetic resonance of the investigated model was characterized by variables which are considerably larger than the half-width determined from experiments with a small sphere. This expansion can be almost eliminated by the use of small thin discs. There is, however, an expansion of the absorption curves, caused by a distortion of the field in the ferrite by the metallic walls of the resonator. Another cause of the expansion of these

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curves is the generation of spin oscillations at higher power levels. (b) Nonresonant Pumping ($\omega \neq \omega_{res}$). The waveguide with the ferrite sample matched by an impedance transformer at the pumping frequency, was a resonator for 10 wavelengths, the cross section 0.4 x 2.3 cm, and Q_{10} = 460 for H_o = 2,800 oersted and ω = 5.85 x 10^{10} cps. The ferrite disc (4 M_o = 3,300 gauss) had a volume had a volume V_Φ = 3 mm^2 and 3.5 mm diam. The resonator of ω_1 frequency was characterized by βV_1 = 24.8 mm^3 and had a Q_1 -factor = 380 for H_o 2,800 oersted.

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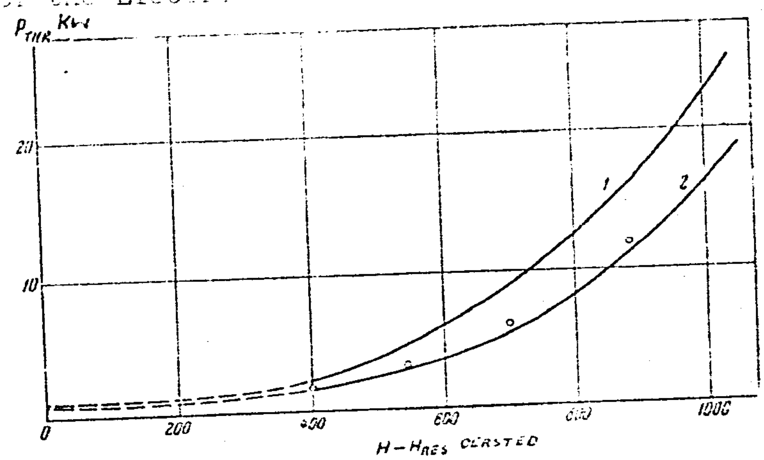

Fig. 7. Threshold power vs. detuning of the working field with reference to the resonant (H_0 - H_{res}). Dotted line shows probable shape of curve in the transition area: (1) theoretical curve; (2) experimental curve.

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The theoretical power threshold values were computed per Eq. (59). The agreement of theoretical and experimental curves is considered satisfactory. The increased deviation for higher power levels is caused by the difficulties of cooling the heated ferrite. (c) The nondegenerate amplifier was experimentally investigated at a pumping frequency

$\omega = 5.85 \times 10^{10}$ cps, $\omega_1 = 2/3\omega, \omega_2 = 1/3\omega$.

This amplifier is distinguished from the degenerate type by addition of an auxiliary contour of frequency ω_2. The magnetic fields of all three frequencies were oriented at 45° to the direction of the constant field. From (31) and (40):

$$h_y \geqslant \frac{2\sqrt{V_1 V_2 \beta_1 \beta_2}}{V_\phi \sqrt{Q_1 Q_2}} \frac{\Delta H}{\omega_M} \frac{9\omega_0 (2\omega_0 + \omega_M)}{16\left(\frac{5}{3}\omega_0 + \omega_M\right) + 40\left(\frac{4}{3}\omega_0 + \omega_M\right)} \qquad (61)$$

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For the nondegenerate amplifier it is also possible to prove agreement of theoretical and experimental data. Conclusion. (1) The basic result of this work is the establishment of agreement between theory and experiment in determining the threshold pumping power of a ferrite amplifier. This makes possible the determination of sizes and parameters of the ferrite resonator, which influences the level of pumping. Curves on Figs. 5 and 6 show that only a short beginning section is advantageous. The first investigations of M. Weiss and of W. L. Whirry and F. B. Wang (all U.S.) were conducted beyond this area, which caused a very high pumping level. Besides this, in the above experiments a half-wave resonator and 2 ferrite discs were used. The consideration of these factors permitted lowering the pumping power to 500 w. The results of experiments by Soviet scientists V. P. Tychiskiy, Yu. T. Derkach, and

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V. V. Karpetskiy did show a threshold power of 4.5, which is due to unreasonable design of the amplifier. (This paper was presented in June 1959 at the session of the Nauchno-tekhnicheskoye obshchestvo radiotekhniki i elektrosvyazi imeni A. S. Popova (Scientific-Technical Society of Radio Engineering and Electro Communication imeni A. S. Popov.) (2) The use of a degenerate-type amplifier, whose pumping frequency is far off the frequency of ferromagnetic resonance, is less advantageous as far as pumping power threshold is concerned. (3) Experiments and theoretical investigations proved that a nondegenerate amplifier with frequency ratio $\omega_1/\omega_2 = 2$ $(\omega_1 + \omega_2 = \omega)$ has a threshold power of the same order as the degenerate amplifier. Generation was observed on both partial frequencies. (4) Use of ferrites with a narrow half-width of the absorption curve (yttrium-monocrystals) most

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probably will not permit a lowering of the threshold power to a value acceptable for practical applications, because in these ferrites higher modes of nonuniform oscillations will be excited. This last conclusion does not apply to amplifiers working on a pumping frequency which is far off the ferromagnetic resonance frequency, or to half-static and magnetostatic amplifiers. A. A. Popova procured monocrystals. There are 7 figures; 1 table; and 5 references, 2 Soviet, 3 U.S. The U.S. references are: H. Suhl, Proposal for a ferromagnetic amplifier in the microwave range, Phys. Rev., 1957, 106, 2, 384; M. Weiss, A solid-state microwave amplifier and oscillator using ferrites, Phys. Rev., 1957, 107, 1, 317; W. L. Whirry, F. B. Wang, Phase dependence of a ferromagnetic microwave amplifier, Proc. I.R.E., 1958, 46, 9, 1657.

SUBMITTED: August 17, 1959

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PRESENTED: At the Anniversary Session of the Scientific-Technical Society of Radio Engineering and Electro Communication imeni A. S. Popov, June 10, 1959

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B117/B112

AUTHORS: Fistul', V. I., Shvarts, N. Z.

TITLE: Tunnel diodes

PERIODICAL: Uspekhi fizicheskikh nauk, v. 77, no. 1, 1962, 109 - 160

TEXT: Western and Soviet studies during the period 1932 - 1961, concerning progress in developing tunnel diodes are reviewed. Special attention is given to the physics of tunnel diodes and their radiotechnical application for high frequencies. The following problems are dealt with: principle of operation of a tunnel diode; tunnel effect of semiconductors; quantitative consideration of the tunnel effect in the p - n junction; physical principles of tunnel diode production; parameters characterizing the tunnel diode (peak current, surplus current, characteristic voltages, negative resistance, capacitance of the p - n junction, time constant, loss resistance, maximum and resonance frequency), designs of tunnel diodes; working conditions of circuits with tunnel diodes and stability problems; measurement of tunnel diode parameters; generators with tunnel diodes; amplifiers with tunnel diodes; some other possibilities of application for tunnel diodes (transformers (mixers), detector, superregenerator); application of tunnel diodes

Card 1/2

SHVARTS, I.Z.

Study of the stability of tunnel diode circuits using the argument principle. Radiotekh. i elektron. 11 no. 2:362-364 F '66. (MIRA 19:2)

1. Submitted April 19, 1965.

SHVARTS, O.

Salinization of soils in Iraq. Pochvovedenie no.1:48-53 Ja '61.
(MIRA 14:1)

1. Shkola sel'skogo khozyaystva i lesovodstva g. Ambo, Efiopiya.
(Iraq--Alkali lands)

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Shvarts, ... Cand Chem Sci

Dissertation: "Concerning Dehydration as a Method for Quantitative Determination of Tertiary Alcohols."

10 June 49

All-Union Sci Res Inst of Synthetic and Natural Essential Oils, Ministry of Food Industry, USSR

SO Vecheryaya Moskva
Sum 71

SHVARTS, O V.

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Benzylation of aromatic hydrocarbons in the presence of activated clay. L. N. Petrova and O. V. Shvarts (Synthetic Nat. Perfum. Inst., Moscow). *Zhur. Obshchei Khim.* (J. Gen. Chem.) **20**, 2168-72(1950). Refluxing 200 g. $PhCH_2OH$ and 200 g. C_6H_6 1 hr. with 20 g. askanite gave 33 g. H_2O and a range of products, b_{11} 125-275° (with 74 g. residue), from which were isolated about 50 g. Ph_2CH_2 and about 22 g. *1,2-$(PhCH_2)_2C_6H_4$*, m. 78°. Similar reaction with MePh gave about 67 g. *1-methyl-4-benzylbenzene*, b. 278-9°, n_D^{20} 1.5710, d_4^{20} 0.9958, and 54.7 g. *dibenzyltoluene*, b_{10} 225-30°, n_D^{20} 1.6019, d_4^{20} 1.0482. *m*-Xylene similarly gave *1,3-dimethyl-5-benzylbenzene*, b_8 130-2°, n_D^{20} 1.5700, d_4^{20} 0.9931, while cumene gave *1-isopropyl-4-benzylbenzene*, b_{10} 147-8°, n_D^{20} 1.5570, d_4^{20} 0.9697. Anisole similarly gave *1-methoxy-4-benzylbenzene*, b_{10} 153-4°, n_D^{20} 1.5780, d_4^{20} 1.0530, and a small amt. of dibenzylated product. PhMeCHOH similarly gave in a reaction with PhMe a small amt. of *1-phenyl-1-p-tolylethane*, b_{10} 151-6°, n_D^{20} 1.5680, d_4^{20} 0.9855, while with *m*-xylene, some *1-phenyl-1-m-xylylethane*, b_{10} 150-60°, n_D^{20} 1.5590, d_4^{20} 0.9801, was formed. Linalool with C_6H_6 gave H_2O elimination within 20 min. of refluxing, but only condensation of the alc. appeared to take place; $PhMe_2COH$ with C_6H_6 gave apparently *2,5-diphenyl-2-hexene*, b_{11} 164-6°, n_D^{20} 1.5676, d_4^{20} 0.9790. Cyclohexylcarbinol, $PhCH_2CH_2OH$, $C_6H_{11}OH$ with MePh do not lose H_2O, while allyl alc. reacts with MeOPh but not with MePh or C_6H_6.

G. M. Kosolapoff

1951

SHVARTS, O.V.

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Benzylation of aromatic hydrocarbons in the presence of activated clay. L. N. Petrova and O. V. Shvarts. J. Gen. Chem. U.S.S.R. 20, 2219-53(1950)(Engl. translation). See C.A. 45, 7075e. B. L. M.

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Mbr., Phytopathological Lab., Voronezh Sta. Plant Diseases, -1939-40-. "A Simple Method for Determining the Infection of Wheat Seeds with Ustilagotritici," Dok. AN, 24, No. 2, 1939; "Anatomical and Cytological Modifications in Cereals Attacked by Mosaic Virus," ibid "Anatomical and Cytological Changes in Seedlings from Chemically Treated Cereal Grain," ibid., 28, No. 4, 1940

RUMANIA/Optics - Spectroscopy.

Abs Jour : Ref Zhur - Fizika, N 6, 1959, 14356

Author : Mikhvl, K., Ruschor, K., Pop, V., Shvarts, R., Redulesky, Ye.A.

Inst : -

Title : Fluorescence of Motorines of Rumanian Oil

Orig Pub : An Stiint. Univ. Lasi. Soc. I., 1957, 3, No 1-2, 243-256

Abstract : An analysis of the fluorescence spectra of pure samples of motorines A_1 special, A_1, A_3 and C and their solutions in ether has shown that the fluorescence of the motorines is caused principally by the naphthalene, phenanthrene, and anthracene, and to a lesser extent by their homologues. The fluorescence spectra of motorine C differ considerably from the spectra of the remaining motorines (which are similar to each other), this being explained by the greater content of anthracene and its homologues. -- V. Klochkov

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The chemistry of silicon. Usp. khim. 26 no.8:923-935 Ag '57.
(Silicon) (MLRA 10:8)

SHVARTS, R.[Svarce, R.]

Chemotherapy (ThioTEPA) of experimental glioma in mice. Vestis Latv ak no.9:115-124 '61.

SHVARTS, R B

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[Manual of water-supply engineering and sewerage] Spravochnik po vodosnabzheniiu i kanalizatsii. Pod red. N.F.Fedorova. Leningrad, Gos.izd-vo lit-ry po stroit., arkhit. i stroit.materialam, 1959. 410 p. (MIRA 13:3)

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(Water-supply engineering) (Sewerage)

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1. Neyrokhirurgicheskaya klinika kafedry gospital'noy khirurgii (zav. - prof. A.F. Lepukalns [Liepukalns, A.]) Rizhskogo meditsinskogo instituta.

SHVARTS, R.YA.

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TRANSPORTATION

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SHVARTS, B.

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SH[illegible], [illegible]

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1. Zamestitel' direktora Gor'kovskogo zaochnogo avtodorozhnogo tekhnikuma (for Shvarts). 2. Moskovskiy avtodorozhnyy institut (for Korf).

APPROVED FOR RELEASE: 08/31/2001 CIA-RDP86-00513R001550330001-3"

SHVARTS, S.

Separating barrels in ships' holds. Mor. i rech.flot 14 no.5: 30 My '54. (MLRA 7:7)
(Ships--Cargo)

SHVARTS, S.

Restoring corroded parts with metallic putty. Mor.flot 15 no.10: 30 O'55. (MIRA 8:12)

(Ships--Maintenance and repair)

APPROVED FOR RELEASE: 08/31/2001 CIA-RDP86-00513R001550330001-3"

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New method of jointing condenser tubes. Mor.flot. 15 no.11:26 N '55. (MLRA 9:2)

1. Chernomorskoye otdeleniye NTOVT.
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PROCESSES AND PROPERTIES INDEX

21

CA

Experiments with air blast in heating coke ovens. S. A. Shvarts. *Coke and Chem.* (U. S. S. R.) 1939, No. 4-5, 30-5; *Khim. Referat. Zhur.* 1939, No. 9, 86-7; cf. *C. A.* 34, 3475[9]. —In Becker-Distocock coke ovens heated with a mixt. of coke-oven gas and blast-furnace gas, the air blast increased the temp. of the heating flues by 60-70° on the coking side. The air blast increased the vol. of air and gas in the coking side by 18-27% as compared with the natural suction of air. Air blast permits use of blast-furnace gases for heating the coke ovens. W. R. Henn

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

Ca

21

Coke oven. S. A. Shvarts. Russ. 57,804, Aug. 31, 1940. Construction details.

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MEYKSON, Lev Veniaminovich; SHVARTS, Semen Aronovich; KUSTOV, B.I., redaktor; LIBERMAN, S.S., redaktor izdatel'stva; ANDREYEV, S.P., tekhnicheskiy redaktor

[Coke production] Proizvodstvo koksa. Khar'kov, Gos.nauchno-tekhn. izd-vo lit-ry po chernoi i tsvetnoi metallurgii, 1955. 394 p. [Microfilm] (MIRA 10:1)
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ARONOV, Samuil Grigor'yevich; BAUTIN, Ivan Grigor'yevich; VOLKOVA, Zoya Andreyevna; VOLOSHIN, Arkhip Il'ich; VIROZUB, Yevgeniy Vladimirovich; GABAY, Lev Izrailevich, DIDENKO, Viktor Yefimovich; ZASHKVARA, Vasiliy Grigor'yevich; IVANOV, Pavel Aleksandrovich, KUSTOV, Boris Iosifovich [deceased]; KOTOV, Ivan Konstantinovich; KOTKIN, Aleksandr Matveyevich; KOMANOVSKIY, Maksim Semenovich; LEYTES, Viktor Abramovich, MOROZ, Mikhail Yakovlevich; NIKOLAYEV, Dmitriy Dmitriyevich. OBUKHOVSKIY Yakov Mironovich; RODSHTEYN, Pavel Moiseyevich; SAPOZHNIKOV, Yakov Yudovich, SENICHENKO, Sergey Yefimovich; TOPORKOV, Vasiliy Yakovlevich; CHERMNYKH Mikhail Sergeyevich; CHERKASSKAYA, Esfir' Ionovna, SHVARTS, Semen Aronovich; SHERMAN, Mikhail Yakovlevich; SHVARTS, Grigoriy Aleksandrovich; LIBERMAN, S.S., redaktor izdatel'stva; ANDREYEV, S.P., tekhnicheskiy redaktor

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Boris Iosifovich Kustov; obituary. Koks i khim. no.2:64 '55. (MLRA 9:3)
(Kustov, Boris Iosifovich, 1910-1955)

SHVARTS

VIROZUB, I.V., kand. tekhn. nauk; VOLOSHIN, A.I., kand. tekhn. nauk; SHVARTS, S.A., kand. tekhn. nauk.

Improving the heating and operating of coke ovens. Koks i khim. no.11:29-35 '57. (MIRA 10:12)

1. Khar'kovskiy nauchno-issledovatel'skiy uglekhimicheskiy institut.
(Coke ovens)

SOV/68-58-12-8/25

AUTHOR: Tsynovnikov, A.S., Shemeryankin, B.V., Shvarts, S.A. and Bogoyavlenskiy, K.A.

TITLE: The Determination of Size Analysis of Coke on Screens with Square and Round Mesh (Opredeleniye sitovogo sostava koksa na sitakh s kvadratnymi i kruglymi otverstiyami)

PERIODICAL: Koks i Khimiya, 1958, Nr 12, pp 25-28 (USSR)

ABSTRACT: The relationship between the size analysis of coke on screens with square and round mesh, namely the ratio of D : S (diameter of square mesh to diameter of round mesh) for cokes of various origin was investigated. The experimental results are shown in figs 1, 2, and Tables 1, 2. Coefficients (K) for recalculating size distribution from screens with round mesh to screens

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SOV/68-58-12-8/25

The Determination of Size Analysis of Coke on Screens with Square and Round Mesh

with square mesh for various types of coke are given in Table 3 and mesh sizes for round and square mesh screens for various size fractions in Table 4.

There are 4 tables and 2 figures.

ASSOCIATIONS: VUKhIN and UKhIN

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SHVARTS, S.A.

5(1) PHASE I BOOK EXPLOITATION SOV/2127

Koksokhimicheskoye proizvodstvo; sbornik statey (By-Product Coking Industry; Collection of Articles) Moscow, Metallurgizdat, 1959. 240 p. 2,500 copies printed.

Ed.: B. S. Filippov; Ed. of Publishing House: A. A. Revyakin; Tech. Ed.: P. G. Islent'yeva

PURPOSE: The book is intended for engineers and technicians in the by-product coking industry and in scientific research institutes. The book may also be used by students in secondary and higher technical schools.

COVERAGE: The articles in this collection on the by-product coking industry appeared originally either in the periodical Koks i khimiya (Coke and Chemistry) or in other publications during 1955-1958. The book discusses the development of raw-material reserves for coking, technology of the manufacture of coke, quality of coke and further enlargement of the number of chemical coking products obtained. Some articles are devoted to a new procedure for preparing and beneficiating coals, new methods for coking, and to the mechanization and automation of industrial processes. References accompany individual articles.

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SOV/68-59-1-7/26

AUTHORS: Shvarts, S.A., Shatunovskiy, I.O. and Onopriyenko, V.P.

TITLE: The Evaluation of the Physico-mechanical Properties of Coke (Otsenka fiziko-mekhanicheskikh svoystv koksa)

PERIODICAL: Koks i Khimiya, 1959, Nr 1, pp 24 - 33 (USSR)

ABSTRACT: Various methods of determining the physico-mechanical properties and quality indices of coke and their correlation with the operation of blast furnaces were investigated. The object of the investigation was to submit samples of coke to parallel tests at a low and a high degree of degradation and to find out which corresponds more closely to the degree of degradation of coke in a blast furnace and which of the indices of physico-mechanical properties of coke is more closely related with the operational indices of blast-furnace operation. All tests were done on 50 kg samples. The tests were performed in a drum 1 m in diameter and 0.4 m long, rotating at 15 rpm. The results obtained with this drum after 150 revolutions corresponded to the standard Russian test in a large drum. The different degree of degradation was obtained by parallel tests at 150, 225 and 300 revolutions of the drum. Composite sample (proportional to the size distribution of coke) and single

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SOV/68-59-1-7/26

The Evaluation of the Physico-mechanical Properties of Coke

size fraction (80-60 mm) of coke were tested. The following indices of coke quality were calculated: a) the amount left in the drum and the content of -10 mm fraction, according to the USSR standard; b) gas permeability index according to Syskov for samples which passed the test at 150, 225 and 300 revolutions; c) indices of uniformity and mean size of coke after testing at a low and a high degree of degradation of composite coke samples and samples of 80-60 mm coke fractions (at 150, 225 and 300 revolutions of the drum); d) strength indices calculating according to Graf (Stahl u. Eisen, 1956, Nr 3, p 133) from tests at 150, 225 and 300 revolutions of the drum; and e) aerodynamic index - "surface area of degradation" for composite samples tested at 225 revolutions of the drum. The investigation was carried out at the Krivoy Rog Iron and Steel Works. Coke from one battery was studied. During the investigation (three months), the components of the coal blend remained constant. The composition of the blend during the first period of the investigation was %: G - 14, Zh - 47, K - 21, OS - 18 and during the

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SOV/68-59-1-7/26

The Evaluation of the Physico-mechanical Properties of Coke

second period %: G - 11, Zh - 47, K - 24 and OS - 18. The coking period was often varied within limits of 15.5 to 18.3 hours. The temperature conditions followed these changes but their establishment usually required some time. Thus the main factor, determining changes in the mechanical properties of coke were thermal conditions of coking. The majority of indices reacted to those changes (Figures 1 and 2). Sampling and testing were carried out every four hours. Altogether 400 samples were tested. Statistical correlations between coke quality indices and coking period were carried out. Correlation coefficients and regression equations are shown in Table 1. All the indices of the coke quality with the exception of the amount left in the drum (standard test) correlated significantly with the coking period. Low correlation coefficients for gas-permeability indices for samples tested under conditions of a high degree of degradation indicated that this method of calculating this index is not applicable for such testing (high number of revolutions of the drum). The influence of the coking period on the size distribution of coke was also confirmed using data for the whole year

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(Figure 3). In order to establish which index of coke quality reflects its metallurgical properties, it was necessary to compare them with some indices of blast-furnace operation. It was considered that the most suitable index of furnace operation would be the temperature of the peripheral gases which well reflects the distribution of the gas stream on the periphery, independently of the causes determining this distribution. As for each furnace operating under a given set of conditions, there is an optimum distribution of gas flow which can be characterised by so small differences between extremes of temperatures in the measuring points that can be considered as an "ideal". If such "ideal" difference divided by the actual difference prevailing in a given moment or by a mean actual difference for a given time interval, then the ratio obtained could be used as a quantitative index - coefficient of the uniformity of the gas stream K. The higher this coefficient, the more uniform is the gas stream distributed along the periphery of the furnace. It should be pointed out that this coefficient does not take into consideration deflection of the gas stream from the periphery towards the centre of the furnace and vice versa. For the purpose of these investigations, the "ideal" difference in the temperature differences along the periphery was taken as 25 °C and coefficient K calculated for 15-minute intervals, from which mean values for 4-hour periods were used for the statistical correlation. The correlation of other furnace operating factors such as hot blast pressure, pressure drop across the furnace, CO_2 content in peripheral gases and the distribution of CO_2 along the throat radius, the nature of spread of temperature indicated by thermocouples in the gas off takes and the diagram of stock descent with the coke quality indices were also tried. It was assessed for the purpose of correlation that the time interval between the coke leaving the coke ovens, its arrival at the furnace bunker and its descent to some depth in the furnace stack (when its influence on furnace operation becomes noticeable) amounts to 8 hours. From the periods of investigation of the coke quality, periods 1 and 2, were chosen for comparison with furnace operation as during these periods most distinct differences in the coke properties and considerable variations in these properties were obtained (Table 2). The relevant data

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The Evaluation of the Physico-mechanical Properties of Coke

characterising coke quality, operating conditions and operating indices of the blast furnace are given in Tables 2-4. The quality of sinter and the main parameters of the furnace operation during these periods were practically constant. The highest correlation coefficient was obtained for indices of the size distribution of metallurgical coke ($r = 0.43 - 0.67$) and size distribution after testing at a low degree of degradation ($r = 0.51 - 0.54$) 95% significance level $r = 0.32$. Less pronounced correlation was obtained with the mechanical strength of coke obtained at a high degree of degradation ($r = 0.33 - 0.39$). This indicates that in a blast furnace, the degree of degradation of coke is comparatively low. From correlation coefficients for the individual size fractions, the highest was obtained for the fraction 40-25 mm ($r = -0.67$) which indicates a substantial negative influence of small coke fraction on the furnace operation. High correlation coefficients were also obtained for 80-60 mm fraction ($r = 0.46$) and the ratio of: $>60/(40-25)$ ($r = 0.43$). Correlation coefficients between K and all indices of coke strength obtained on testing at a low degree of degradation were

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of the same order. Therefore, the choice of the best coke quality index should be based on its degree of correlation with technological factors of coke production. For these reasons, the index calculated according to Graf is preferable. As one of the objectives of this work was to determine the simplest possible method of testing from the results obtained, the following can be concluded: the weight of the sample of 50 kg made from a single-size fraction (80-60 mm), rotated at 25 rpm for 100-150 revolutions appears to be sufficient. The comparison of results obtained on parallel tests of samples made of single and composite size fraction is shown in Figures 4 and 5. As an index of coke quality, the following ratio is proposed:

$$\frac{\%\ (>60)}{\%\ (40-25) + \%\ (<10)}$$

which is similar but more sensitive than that proposed by Graf (Figure 6).

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The Evaluation of the Physico-mechanical Properties of Coke

There are 6 figures, 4 tables and 4 references, 3 of which are Soviet and 1 German.

ASSOCIATIONS: UKhIN and Ukrainskiy institut metallov (Ukrainian Institute of Metals)

Card 8/8

Candidate of Technical Sciences; SOV/68-59-8-3/32

AUTHORS: Shvarts, S.A., Shinkareva, T.V. and Tolochko, A.I.

TITLE: Material Balance of the Coking Process (Material'nyy balans protsessa koksovaniya)

PERIODICAL: Koks i khimiya, 1959, Nr 8, pp 6-12 (USSR)

ABSTRACT: Material balance of the coking process reported by various works are often inaccurate and contain a considerable percentage of unaccounted losses. As an illustration of the inaccuracies, percentages of carbon deposition reported by various works are compared with volatile content of the respective blends (Table 1). Although the differences in the volatile content and coking conditions are small the variability of the carbon depositions reaches 5%. It is concluded that the differences in the reported coke yields are mainly due to inaccuracies. Similarly the reported gas yields are subject to errors due to inaccuracies in gas measurements and weighing of coal charged. The yields of tar, benzole and ammonia are usually reported more accurately but the yield of pyrogenic water is usually not determined at all and this item in works

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SOV/68-59-8-3/32

Material Balance of the Coking Process

balances is either included in losses or a theoretical figure is reported. The above deficiencies of works' balances made it necessary for UKhIN to carry out a special work to obtain true yields of the individual products. The work was carried out on the Krivorozhsk Metallurgical Works during a period of 25 days. The results obtained are given in Table 2 (methods used for the determination of the yield of individual products are described in some detail). The unaccounted losses amount to 0.71%. In order to check the data obtained the material balance was recalculated for the individual elements (Table 3). The following results were obtained: sulphur balance agreed well; nitrogen balance indicated surplus of this element in coking products in an amount of 3.5 kg/ton of dry coal, indicating infiltration of air in an amount of 4.6 kg/t of dry coal; hydrogen balance was poor, its diffusion into the heating system was assumed; oxygen balance was satisfactory, if the above mentioned infiltration of air is taken into consideration; carbon balance indicated losses of carbon in an amount of about 1.8 kg/ton of dry coal (-0.18%);

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